Performance of Diesel Engine Working on Neem Oil Blends

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I. Introduction

There are more than 350 oil bearing crops identified, among which only Jatropha, ongamia, sunflower, Soyabean, cottonseed, rapeseed, palm oil and peanut oil are considered as potential alternative fuels for diesel engines. The present study aims to investigate the use of neem oil blend with diesel as an alternate fuel for compression ignition engine.

II. Methods

The properties of diesel and biodiesel (neem oil methyl ester) used in present investigation were compared with diesel fuel in Table.1

Table.1 Specification of test engine

Company and Model	Kirloskar oil Engine , SV1
Type	Single cylinder, 4- Stroke, diesel engine
Bore	87.5mm
Stroke	110mm
Rpm	1800rpm
Rated power	8 HP
Type of cooling	Water cooled
Compression ratio	16.5:1

III. Results And Discussion

A series of engine tests were carried out using diesel and biodiesel to find out the effect of various blends on the performance of the engine. Investigations are carried out on the engine mainly to the effect of brake specific fuel consumption, air consumption, brake thermal efficiency, heat supplied and speed.

3.1 **consumption**

In fig.2 Air consumption rate is plotted against different loads. Air consumption increases with increase in load. The air consumption for B10 is increased by 8.33%, to 11.49% as compared to diesel and air consumption for B20 is increased by 6.25% to 9.37% as compared to B10 at different load, this is due to lower calorific value of fuel.

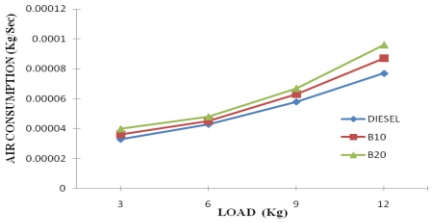

Fig. 2 Variation of Air Consumption for neem oil blended with diesel

3.2 Thermal efficiency

In fig.3 Brake thermal efficiency is plotted against the various loads for neem oil blended with diesel. The brake thermal efficiency is defined as the actual brake power per cycle divide by the amount of fuel chemical energy. Brake thermal efficiency for B10 is reduced by 21.10% as compared to diesel at maximum load and BTE for B20 is reduced by10.52% as compared to B10 at minimum load and 7.62% at maximum load. This reduction in brake thermal efficiency with biodiesel blends was due to higher viscosity, poor spray characteristics and lower calorific value. The higher viscosity leads to decreased atomization, fuel vaporization and combustion and hence the thermal efficiency of the biodiesel blends is lower than that of diesel.

IV. Conclusion

The properties results of all blends show that blends up to 20% straight neem oil have value of viscosity and density equivalent to specified range for CI engine fuel, therefore it can be concluded that up to 20% blends can be used to run the CI engine at short term basis.

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